

Don't Just Leave Science to the Scientists

If you are like me, you are not a professional scientist. Given that, it may seem rational to simply leave scientific thinking to the scientists. It would seem silly and arrogant to “think for yourself” in a scientific domain, when there are plenty of experts who have thought much longer and deeper in that domain than you!

But though we should respect expertise, we should still try to gain skill in scientific thinking. One reason is that the skill is applicable to lots of situations in everyday life. Suppose you can't get online from your computer. A good method here is to “test hypotheses” one-by-one, in order to identify the problem. Does your software need an update? Does your operating system? Did you forget to pay your internet bill? Etc.

However, such “hypothesis testing” hardly requires in-depth understanding of “base rates,” “statistical independence,” “statistical significance,” “randomized placebo-controlled trials,” etc. Yet such understanding is also beneficial for you to acquire. Why? Well...

1. Even though you may be unable to challenge the *collective* of experts in a field, sometimes you can reasonably challenge an individual expert. That's because individuals can make mistakes in their thinking, sometimes fairly elementary ones. And so, it's good to understand things well enough to catch such mistakes.
2. Apart from raising challenges, you can also ask good questions—and that means that you can help advance an expert's understanding. Indeed, scientists often report that they learn new things from their students, not because their students have a better overall understanding, but because their students pointed out one thing they hadn't noticed before.
3. Some people who claim to be experts on a scientific topic are not really experts. One way to spot the difference is to see whether the alleged expert understands more than the basics of scientific thinking. So again, it is best for *you* to understand more than the basics, in order to better recognize the phonies.
4. Understanding for yourself the lessons from science is a way to reinforce scientific lessons. For example, nutritionists say “Eat more Omega-3 fats.” Suppose you learn that this is supported by several randomized, placebo-controlled trials where a diet high in Omega-3s has a statistically significant association with less heart disease. Then, instead of just taking the advice “on faith,” understanding all this will help motivate you to follow the advice.
5. Understanding scientific thinking will help understand how science is limited in what it knows. That is important, since sometimes science is regarded as completely authoritative. Yet, while science *is* the most secure way to know about our world, it is far from perfect. A more scientific understanding of science reveals that it is *not* completely authoritative, and this can be important to recognize in various contexts.